

CONTENTS

GLOSSARY	1
1	INTRODUCTION.....	1-1
1.1	General	1-1
1.2	Purpose and Need for Project.....	1-1
1.3	Project Overview	1-1
1.3.1	EACOP System	1-1
1.3.2	EACOP Uganda.....	1-2
1.3.3	Developer Contact Information.....	1-5
1.4	Environmental Impact Statement Overview.....	1-5
1.4.1	Purpose.....	1-5
1.4.2	Environmental and Social Impact Assessment Team	1-6
1.5	Environmental Impact Statement Structure	1-10
2	PROJECT BACKGROUND AND DESCRIPTION	2-1
2.1	Introduction	2-1
2.1.1	Project Description Contents	2-1
2.2	Project Design.....	2-2
2.2.1	Project Design Overview	2-2
2.2.2	International Standards.....	2-4
2.2.3	Pre-Front-End Engineering and Design, and Front-End Engineering and Design Studies	2-4
2.3	Project Components.....	2-5
2.3.1	Pipeline	2-5
2.3.2	Typical EACOP Section.....	2-7
2.3.3	Aboveground Installations	2-8
2.3.3.1	Introduction	2-8
2.3.3.2	Pumping Stations.....	2-9
2.3.3.3	Electric Substations	2-11
2.3.3.4	Block Valves	2-13
2.3.4	Construction Facilities.....	2-16
2.3.4.1	Camps.....	2-17
2.3.4.2	Pipe Yards	2-19
2.3.5	Access Roads.....	2-19
2.3.6	Land Requirements	2-20
2.3.6.1	Area Requirements	2-20
2.3.6.2	Land Acquisition.....	2-21
2.4	Project Activities	2-21
2.4.1	Feasibility Surveys.....	2-21
2.4.1.1	Geological, Geotechnical and Geophysical Survey.....	2-22
2.4.1.2	Water Supply Study	2-22
2.4.2	Construction.....	2-23
2.4.2.1	Strategy and Logistics.....	2-23

2.4.2.2	Pipeline	2-31
2.4.2.3	Construction Facilities.....	2-43
2.4.2.4	Aboveground Installations.....	2-43
2.4.2.5	Crossings	2-44
2.4.2.6	Roads.....	2-50
2.4.2.7	Emissions, Discharges and Chemicals.....	2-51
2.4.2.8	Construction Waste Management	2-52
2.4.3	Soil Management, Erosion Control and Reinstatement	2-55
2.4.3.1	Philosophy	2-55
2.4.3.2	Soil Management.....	2-55
2.4.3.3	Erosion and Sediment Control.....	2-55
2.4.3.4	Reinstatement.....	2-59
2.4.4	Pre-commissioning, Commissioning and Start-up.....	2-60
2.4.4.1	Overview	2-60
2.4.4.2	Pipeline	2-61
2.4.4.3	Aboveground Installations.....	2-63
2.4.5	Operations	2-63
2.4.5.1	Operating Philosophy.....	2-63
2.4.5.2	Operations and Maintenance.....	2-63
2.4.5.3	Resources and Local Resourcing.....	2-65
2.4.5.4	Emissions, Discharges and Chemicals.....	2-66
2.4.5.5	Operations Waste Management	2-66
2.4.5.6	Monitoring	2-68
2.4.6	Decommissioning	2-70
2.4.6.1	Construction Facilities.....	2-70
2.4.6.2	Pipeline	2-70
2.5	Associated Facilities and Third-Party Developments	2-71
2.5.1	Associated Facilities	2-71
2.5.2	Third-Party Developments	2-72
2.6	Schedule	2-73
3	ALTERNATIVES.....	3-1
3.1	Introduction	3-1
3.2	Overview	3-1
3.3	Approach to Alternatives Assessment	3-1
3.4	Zero Project Alternative.....	3-2
3.4.1	Overview	3-2
3.4.2	Rail.....	3-3
3.4.3	Road	3-3
3.4.4	Summary.....	3-3
3.5	Pipeline Routing	3-4
3.5.1	Overview	3-4
3.5.2	Prior Front-End Engineering and Design.....	3-4
3.5.2.1	Initial Pipeline Corridor Options	3-4
3.5.2.2	Corridor Options Screening	3-6
3.5.2.3	Route Refinement.....	3-7
3.5.2.4	Pre-Front-End Engineering and Design Route Optimisation (V2 to V3)	3-10

3.5.3	Front-End Engineering and Design	3-11
3.5.3.1	(V4 and V5) Routing Refinements	3-11
3.5.3.2	V5 to V6 Routing Refinements	3-14
3.5.3.3	V6 Base Case Route	3-15
3.6	Facility Siting	3-15
3.6.1	Overview	3-15
3.6.2	Aboveground Installations	3-15
3.6.2.1	Pumping Stations.....	3-15
3.6.2.2	Electric Substations	3-17
3.6.3	Block Valves	3-17
3.6.4	Construction Facilities.....	3-18
3.6.4.1	MCPY 1.....	3-19
3.6.4.2	MCPY 2.....	3-23
3.6.4.3	MCPY3.....	3-26
3.6.4.4	MCPY4.....	3-29
3.7	Technology.....	3-34
3.7.1	Overview	3-34
3.7.2	Pipeline	3-35
3.7.3	Pumps.....	3-35
3.7.3.1	Type	3-35
3.7.3.2	Number and Configuration.....	3-35
3.7.4	Power Generation.....	3-36
3.7.5	Thermal Insulation	3-37
3.7.6	Heating.....	3-38
3.7.6.1	Electrical Heat Tracing System Types.....	3-40
3.7.6.2	Bulk Heater Technology.....	3-40
3.8	Construction Techniques	3-41
3.8.1	Overview	3-41
3.8.2	Strategy and Logistics	3-41
3.8.3	Pipeline Construction.....	3-43
3.8.3.1	Construction Techniques	3-43
3.8.3.2	Blasting and Micro-blasting.....	3-44
3.8.3.3	Crossings	3-44
3.8.3.4	Water Sourcing	3-46
3.8.3.5	Waste Management.....	3-47
4	LEGISLATIVE, POLICY AND ADMINISTRATIVE FRAMEWORK, PERMITTING REQUIREMENTS, AND INTERNATIONAL CONVENTIONS, STANDARDS, GUIDELINES AND AGREEMENTS.....	4-1
4.1	Introduction	4-1
4.2	Legislative, Policy, Regulatory and Institutional Framework.....	4-1
4.2.1	Legislation.....	4-1
4.2.2	Policies and Plans	4-20
4.2.3	Regulations and Guidelines.....	4-40
4.2.4	Forthcoming Legislation.....	4-53
4.2.5	Institutional Framework.....	4-53
4.3	Permitting Requirements.....	4-61

4.3.1	Environmental and Social Impact Assessment Preparation and Approval Procedure	4-61
4.3.2	Permits, Licences and Authorisations	4-64
4.4	International Conventions, Agreements, Standards and Guidelines	4-70
4.4.1	International Conventions and Agreements	4-70
4.4.2	International Finance Corporation Standards and Guidelines.....	4-79
4.4.2.1	International Finance Corporation Performance Standards	4-79
4.4.2.2	International Finance Corporation Environmental, Health and Safety Guidelines	4-80
4.4.2.3	International Finance Corporation and World Bank Social and Stakeholder Engagement Guidelines.....	4-81
4.4.3	Equator Principles.....	4-82
4.4.4	Organisation for Economic Co-operation and Development Common Approaches	4-83
4.4.5	International Management System Standards	4-84
4.4.6	Other International Good Practice Guidance.....	4-85
4.4.7	Relevant International Soft Law Instruments.....	4-86
4.5	Inter-Government and Host Government Agreements	4-88
5	ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT PROCESS AND METHOD ...	5-1
5.1	Introduction	5-1
5.2	Environmental and Social Impact Assessment Process.....	5-1
5.3	Valued Environmental and Social Components	5-3
5.4	Screening	5-4
5.5	Scoping	5-4
5.6	Impact Assessment.....	5-5
5.6.1	Identification of Project Impacts	5-5
5.6.2	Normal Project Construction and Operations	5-5
5.6.2.1	Project Impacts - Generic and Location-specific	5-6
5.6.2.2	Impact Types	5-6
5.6.2.3	Cumulative Impacts	5-7
5.6.2.4	Mitigation Measures.....	5-11
5.6.2.5	Impact Significance.....	5-13
5.6.3	Abnormal Operations and Unplanned Events	5-18
5.6.4	Environmental and Social Management Plan.....	5-19
6	ENVIRONMENTAL AND SOCIAL BASELINE CONDITIONS	6-1
6.1	Introduction	6-1
6.2	Valued Environmental Components	6-1
6.3	Area of Influence	6-3
6.4	Environmental and Social Baseline	6-4
6.4.1	Biodiversity.....	6-4
6.4.1.1	Legally Protected, Internationally or Nationally Recognised Areas.....	6-4
6.4.1.2	Botany Biodiversity	6-17
6.4.1.3	Aquatic Biodiversity.....	6-31
6.4.1.4	Avifauna Biodiversity.....	6-40
6.4.1.5	Fauna Biodiversity	6-47
6.4.2	Physical Environment	6-57

6.4.2.1	Geology and Soil.....	6-57
6.4.2.2	Surface Water	6-63
6.4.2.3	Groundwater	6-85
6.4.2.4	Landscape	6-90
6.4.2.5	Air Quality	6-97
6.4.2.6	Acoustic Environment	6-101
6.4.3	Socio-economic and Health Environment	6-106
6.4.3.1	Area of Influence.....	6-106
6.4.3.2	Methods	6-107
6.4.3.3	Governance and Administration	6-115
6.4.3.4	Demographics.....	6-117
6.4.3.5	Education	6-121
6.4.3.6	Economy	6-123
6.4.3.7	Local Economy (Nonland-Based Livelihoods).....	6-128
6.4.3.8	Land-Based Livelihoods.....	6-131
6.4.3.9	River- and Lake-Based Livelihoods	6-153
6.4.3.10	Land and Property	6-157
6.4.3.11	Workers' Health, Safety and Welfare.....	6-162
6.4.3.12	Social Infrastructure and Services	6-165
6.4.3.13	Community Health	6-168
6.4.3.14	Community Safety, Security and Welfare	6-189
6.4.3.15	Traffic	6-195
6.4.3.16	Tangible and Intangible Cultural Heritage	6-200
6.4.4	Climate	6-205
6.5	Ecosystem Services.....	6-209
6.5.1	Ecosystem Service Coverage.....	6-209
7	STAKEHOLDER ENGAGEMENT.....	7-1
7.1	Introduction	7-1
7.2	Stakeholder Engagement Principles and Protocols.....	7-1
7.3	Environmental and Social Impact Assessment Stakeholder Engagement Objectives	7-3
7.4	Environmental and Social Impact Assessment Stakeholder Engagement Planning	7-3
7.5	Environmental and Social Impact Assessment Stakeholder Engagement Activities	7-4
7.5.1	Stakeholder Engagement During the Scoping Phase	7-4
7.5.1.1	Stakeholder Identification.....	7-4
7.5.1.2	Scoping Stakeholder Engagement Objectives	7-5
7.5.1.3	Scoping Engagement Approach	7-6
7.5.2	Stakeholder Engagement During the Baseline and Impact Assessment Phase.	7-10
7.5.2.1	Baseline and Impact Assessment Stakeholder Engagement Objectives	7-10
7.5.2.2	Baseline and Impact Assessment Engagement Approach.....	7-10
7.5.3	Human Rights Stakeholder Engagement	7-16
7.5.4	Environmental and Social Impact Assessment Pre-Submission Stakeholder Engagement.....	7-16
7.5.4.1	Environmental and Social Impact Assessment Pre-Submission Engagement Objectives	7-16
7.5.4.2	ESIA Pre-Submission Engagement Approach	7-17
7.6	Stakeholder Engagement Results	7-20

7.6.1	Socio-economic and Health.....	7-24
7.6.1.1	Land and Property	7-24
7.6.1.2	In-Migration and Foreign Workforce	7-26
7.6.1.3	Community Health and Safety	7-27
7.6.1.4	Economy and Standard of Living.....	7-29
7.6.2	Physical Environment	7-30
7.6.3	Biodiversity.....	7-31
7.6.4	Project and Environmental and Social Impact Assessment Related Matters (Including Environmental and Social Impact Assessment Stakeholder Engagement)	7-32
7.7	Grievance Procedure	7-34
7.8	Government Environmental Impact Statement Disclosure	7-36
7.9	Ongoing Stakeholder Engagement.....	7-37
7.9.1	Post-Environmental and Social Impact Assessment Submission Stakeholder Engagement.....	7-37
7.9.2	Community Engagement	7-38
7.9.3	Community Awareness Programmes	7-38
8	IMPACT IDENTIFICATION AND EVALUATION – NORMAL CONSTRUCTION AND OPERATIONS	8-1
8.1	Introduction	8-1
8.1.1	Scope.....	8-1
8.1.2	Approach.....	8-2
8.1.2.1	Ecosystem Services.....	8-3
8.1.2.2	Climate	8-4
8.1.2.3	Pipeline and AGI Decommissioning	8-4
8.1.2.4	Associated Facilities	8-4
8.2	Biodiversity: Habitats of Conservation Importance	8-4
8.2.1	Key Sensitivities and Considerations	8-4
8.2.2	Potential Project Impacts	8-6
8.2.2.1	Introduction	8-6
8.2.2.2	Construction Phase.....	8-6
8.2.2.3	Operation	8-15
8.2.3	Mitigation Measures.....	8-15
8.2.3.1	Design	8-15
8.2.3.2	Construction	8-17
8.2.3.3	Operations	8-22
8.2.4	Residual Impacts and Significance Summary	8-22
8.2.4.1	Generic and Location-Specific Impacts	8-22
8.2.5	Transboundary Project Impacts.....	8-26
8.2.6	Cumulative Impacts	8-26
8.2.6.1	Transboundary Cumulative Impacts	8-26
8.3	Biodiversity: Flora and Fauna Species of Conservation Importance	8-26
8.3.1	Key Sensitivities and Considerations	8-26
8.3.2	Potential Project Impacts	8-28
8.3.2.1	Construction	8-29
8.3.2.2	Operation	8-41
8.3.3	Mitigation Measures.....	8-41

8.3.3.1	Design.....	8-42
8.3.3.2	Construction.....	8-43
8.3.3.3	Operations	8-55
8.3.4	Residual Impacts and Significance Summary	8-55
8.3.4.1	Generic and Location-Specific Impacts	8-55
8.3.5	Transboundary Project Impacts.....	8-65
8.3.6	Cumulative Impacts	8-65
8.3.6.1	Context.....	8-65
8.3.6.2	Cumulative Impacts	8-65
8.3.6.3	Transboundary Cumulative Impacts	8-69
8.4	Biodiversity: Legally Protected, Internationally or Nationally Recognised Areas	8-69
8.4.1	Key Sensitivities and Considerations	8-69
8.4.2	Potential Project Impacts	8-70
8.4.2.1	Construction	8-70
8.4.2.2	Operation	8-70
8.4.3	Mitigation Measures.....	8-71
8.4.3.1	Design.....	8-71
8.4.3.2	Construction	8-71
8.4.4	Residual Impacts and Significance Summary	8-72
8.4.5	Transboundary Project Impacts.....	8-74
8.4.6	Cumulative Impacts	8-74
8.4.6.1	Transboundary Cumulative Impacts	8-74
8.5	Soils 8-74	
8.5.1	Key Sensitivities and Considerations	8-74
8.5.2	Potential Project Impacts	8-75
8.5.2.1	Construction	8-75
8.5.2.2	Project Operation	8-80
8.5.3	Mitigation Measures.....	8-81
8.5.3.1	Design.....	8-81
8.5.3.2	Construction	8-82
8.5.3.3	Operation	8-85
8.5.4	Residual Impacts and Significance Summary	8-85
8.5.4.1	Generic Impacts.....	8-85
8.5.4.2	Location-Specific Impacts	8-86
8.5.4.3	Ecosystem Services.....	8-86
8.5.5	Transboundary Project Impacts.....	8-90
8.5.6	Cumulative Impacts	8-90
8.5.6.1	Transboundary Cummulative Impacts	8-90
8.6	Surface Water	8-90
8.6.1	Key Sensitivities and Considerations	8-90
8.6.2	Potential Project Impacts	8-91
8.6.2.1	Construction	8-91
8.6.2.2	Operation	8-96
8.6.3	Mitigation Measures.....	8-96
8.6.3.1	Design.....	8-97
8.6.3.2	Construction	8-97
8.6.3.3	Operation	8-100

8.6.4	Residual Impacts and Significance Summary	8-100
8.6.4.1	Generic Impacts.....	8-100
8.6.4.2	Location-Specific Impacts	8-101
8.6.5	Transboundary Project Impacts.....	8-105
8.6.6	Cumulative Impacts	8-105
8.6.6.1	Transboundary Cummulative Impacts	8-105
8.7	Groundwater	8-105
8.7.1	Key Sensitivities and Considerations	8-105
8.7.2	Potential Project Impacts	8-106
8.7.2.1	Construction	8-106
8.7.2.2	Operation	8-108
8.7.3	Mitigation Measures.....	8-108
8.7.3.1	Design.....	8-108
8.7.3.2	Construction	8-109
8.7.4	Residual Impacts and Significance Summary	8-111
8.7.5	Transboundary Project Impacts.....	8-114
8.7.6	Cumulative Impacts	8-114
8.7.6.1	Transboundary Cumulative Impacts	8-114
8.8	Landscape.....	8-114
8.8.1	Key Sensitivities and Considerations	8-114
8.8.2	Potential Project Impacts	8-115
8.8.2.1	Construction	8-115
8.8.2.2	Operation	8-117
8.8.3	Mitigation Measures.....	8-120
8.8.3.1	Design.....	8-120
8.8.3.2	Construction	8-121
8.8.3.3	Operation	8-122
8.8.4	Residual Impacts and Significance Summary	8-123
8.8.4.1	Generic and Location-Specific Impacts	8-123
8.8.4.2	Ecosystem Services.....	8-123
8.8.5	Transboundary Project Impacts.....	8-126
8.8.6	Cumulative Impacts	8-126
8.8.6.1	Context.....	8-126
8.8.6.2	Cumulative Impacts	8-126
8.8.6.3	Transboundary Cumulative Impacts	8-127
8.9	Air Quality.....	8-127
8.9.1	Key Sensitivities and Considerations	8-127
8.9.2	Potential Project Impacts	8-128
8.9.2.1	Construction	8-128
8.9.2.2	Operation	8-130
8.9.3	Mitigation Measures.....	8-131
8.9.3.1	Design.....	8-132
8.9.3.2	Construction	8-132
8.9.3.3	Project Operation	8-133
8.9.4	Residual Impacts and Significance Summary	8-135
8.9.5	Transboundary Project Impacts.....	8-139
8.9.6	Cumulative Impacts	8-139

8.9.6.1	Context.....	8-139
8.9.6.2	Cumulative Impacts	8-139
8.9.6.3	Transboundary Cumulative Impacts	8-141
8.10	Acoustic Environment	8-141
8.10.1	Key Sensitivities and Considerations	8-142
8.10.1.1	Approach to Quantifying Impacts.....	8-142
8.10.2	Potential Project Impacts	8-143
8.10.2.1	Construction.....	8-143
8.10.2.2	Operation	8-147
8.10.3	Mitigation Measures.....	8-149
8.10.3.1	Design.....	8-149
8.10.3.2	Construction.....	8-149
8.10.3.3	Project Operation.....	8-153
8.10.4	Residual Impacts and Significance Summary	8-153
8.10.4.1	Further Emissions Management Design.....	8-157
8.10.5	Transboundary Project Impacts.....	8-157
8.10.6	Cumulative Impacts	8-157
8.10.6.1	Context.....	8-157
8.10.6.2	Cumulative Impacts	8-158
8.10.6.3	Transboundary Cumulative Impacts	8-159
8.11	Economy	8-159
8.11.1	Key Sensitivities and Considerations	8-159
8.11.2	Project Benefits.....	8-160
8.11.2.1	Construction.....	8-160
8.11.2.2	Operation	8-164
8.11.3	Enhancement Measures.....	8-166
8.11.3.1	Design.....	8-166
8.11.3.2	Construction.....	8-166
8.11.3.3	Operation	8-166
8.11.4	Transboundary Project Impacts.....	8-168
8.11.5	Cumulative Impacts	8-168
8.12	Local Economy (Nonland-Based Livelihoods)	8-168
8.12.1	Key Sensitivities and Considerations	8-168
8.12.2	Potential Project Impacts	8-169
8.12.2.1	General	8-169
8.12.2.2	Construction.....	8-169
8.12.2.3	Operation	8-177
8.12.3	Enhancement and Mitigation Measures	8-178
8.12.3.1	Design.....	8-179
8.12.3.2	Construction.....	8-179
8.12.3.3	Operation	8-183
8.12.4	Residual Impacts and Significance Summary	8-184
8.12.4.1	Ecosystem Services.....	8-184
8.12.5	Transboundary Project Impacts.....	8-190
8.12.5.1	Generic Transboundary Project Impacts	8-190
8.12.5.2	Location-Specific Transboundary Project Benefits.....	8-190
8.12.5.3	Location-Specific Transboundary Project Impacts	8-191

8.12.6	Cumulative Impacts	8-191
8.12.6.1	Context.....	8-191
8.12.6.2	Cumulative Impacts	8-192
8.12.6.3	Cumulative Transboundary Impacts	8-198
8.13	Land-Based Livelihoods.....	8-198
8.13.1	Key Sensitivities and Considerations	8-198
8.13.2	Potential Project Impacts	8-202
8.13.2.1	Construction.....	8-202
8.13.2.2	Operation	8-210
8.13.3	Mitigation Measures.....	8-211
8.13.3.1	Design.....	8-211
8.13.3.2	Construction.....	8-212
8.13.3.3	Operation	8-216
8.13.4	Residual Impacts and Significance Summary	8-216
8.13.4.1	Ecosystem Services.....	8-216
8.13.5	Transboundary Project Impacts.....	8-223
8.13.5.1	Generic Transboundary Project Impacts	8-223
8.13.6	Cumulative Impacts	8-223
8.13.6.1	Context.....	8-223
8.13.6.2	Cumulative Impacts	8-224
8.13.6.3	Cumulative Transboundary Impacts	8-228
8.14	River and Lake-Based Livelihoods	8-228
8.14.1	Key Sensitivities and Considerations	8-229
8.14.2	Potential Project Impacts	8-230
8.14.2.1	Construction.....	8-230
8.14.2.2	Operation	8-232
8.14.3	Mitigation Measures.....	8-232
8.14.3.1	Design.....	8-232
8.14.3.2	Construction.....	8-233
8.14.3.3	Operation	8-234
8.14.4	Residual Impacts and Significance Summary	8-235
8.14.4.1	Ecosystem Services.....	8-235
8.14.5	Transboundary Project Impacts.....	8-237
8.14.6	Cumulative Impacts	8-237
8.14.6.1	Cumulative Transboundary Impacts	8-237
8.15	Land and Property.....	8-237
8.15.1	Key Sensitivities and Considerations	8-237
8.15.2	Potential Project Impacts	8-240
8.15.2.1	Construction.....	8-240
8.15.2.2	Operation	8-248
8.15.3	Mitigation Measures.....	8-248
8.15.3.1	Design.....	8-248
8.15.3.2	Construction.....	8-249

8.15.3.3	Generic Mitigation Measures	8-249
8.15.3.4	Operation	8-251
8.15.4	Residual Impacts and Significance Summary	8-251
8.15.4.1	Ecosystem Services.....	8-251
8.15.5	Transboundary Project Impacts.....	8-257
8.15.6	Cumulative Impacts	8-257
8.15.6.1	Context.....	8-257
8.15.6.2	Cumulative Impacts	8-258
8.15.6.3	Cumulative Transboundary Impacts.....	8-265
8.16	Workers' Health, Safety and Welfare.....	8-265
8.16.1	Key Sensitivities and Considerations	8-265
8.16.2	Potential Project Impacts	8-266
8.16.2.1	Construction.....	8-266
8.16.2.2	Operation	8-268
8.16.3	Enhancement and Mitigation Measures	8-269
8.16.3.1	Design.....	8-269
8.16.3.2	Construction.....	8-269
8.16.3.3	Operation	8-271
8.16.4	Residual Impacts and Significance Summary	8-272
8.16.4.1	Ecosystem Services.....	8-272
8.16.5	Transboundary Project Impacts.....	8-274
8.16.6	Cumulative Impacts	8-274
8.16.6.1	Cumulative Transboundary Impacts	8-274
8.17	Social Infrastructure and Services	8-274
8.17.1	Key Sensitivities and Considerations	8-274
8.17.2	Potential Project Impacts	8-275
8.17.2.1	Construction.....	8-275
8.17.2.2	Operation	8-284
8.17.3	Enhancement and Mitigation Measures	8-284
8.17.3.1	Design.....	8-284
8.17.3.2	Construction.....	8-285
8.17.3.3	Operation	8-286
8.17.4	Residual Impacts and Significance Summary	8-287
8.17.5	Transboundary Project Impacts.....	8-290
8.17.5.1	Generic Transboundary Project Impacts	8-290
8.17.5.2	Location-Specific Transboundary Project Impacts	8-290
8.17.6	Cumulative Impacts	8-290
8.17.6.1	Context.....	8-290
8.17.6.2	Cumulative Impacts	8-291
8.17.6.3	Transboundary Cumulative Impacts	8-295
8.18	Community Health.....	8-295
8.18.1	Key Sensitivities and Considerations	8-295
8.18.2	Potential Project Impacts	8-297
8.18.2.1	Construction.....	8-297
8.18.2.2	Operation	8-306
8.18.3	Mitigation Measures.....	8-307

8.18.3.1	Design.....	8-307
8.18.3.2	Construction.....	8-307
8.18.3.3	Operation	8-312
8.18.4	Residual Impacts and Significance Summary	8-313
8.18.4.1	Ecosystem Services.....	8-313
8.18.5	Transboundary Project Impacts.....	8-321
8.18.5.1	Generic Transboundary Project Impacts	8-321
8.18.5.2	Location-Specific Transboundary Project Impacts	8-321
8.18.6	Cumulative Impacts	8-321
8.18.6.1	Context.....	8-321
8.18.6.2	Cumulative Impacts	8-322
8.18.6.3	Transboundary Cumulative Impacts	8-327
8.19	Community Safety, Security and Welfare	8-328
8.19.1	Key Sensitivities and Considerations	8-328
8.19.2	Potential Project Impacts	8-329
8.19.2.1	Construction.....	8-329
8.19.2.2	Operation	8-333
8.19.3	Mitigation Measures.....	8-333
8.19.3.1	Design	8-334
8.19.3.2	Construction.....	8-334
8.19.3.3	Operation	8-337
8.19.4	Residual Impacts and Significance Summary	8-337
8.19.4.1	Ecosystem Services.....	8-337
8.19.5	Transboundary Project Impacts.....	8-341
8.19.5.1	Generic Transboundary Project Impacts	8-341
8.19.5.2	Location-Specific Transboundary Project Impacts	8-341
8.19.6	Cumulative Impacts	8-341
8.19.6.1	Context.....	8-341
8.19.6.2	Cumulative Impacts	8-342
8.19.6.3	Cumulative Transboundary Impacts	8-345
8.20	Tangible and Intangible Cultural Heritage.....	8-346
8.20.1	Key Sensitivities and Considerations	8-346
8.20.2	Potential Project Impacts	8-347
8.20.2.1	Introduction	8-347
8.20.2.2	Construction	8-348
8.20.2.3	Operation	8-350
8.20.3	Mitigation Measures.....	8-351
8.20.3.1	Design Phase.....	8-351
8.20.3.2	Construction	8-351
8.20.3.3	Operation	8-353
8.20.4	Residual Impacts and Significance Summary	8-354
8.20.4.1	Generic and Location-Specific Impacts	8-354
8.20.4.2	Ecosystem Services.....	8-354
8.20.5	Transboundary Project Impacts.....	8-360
8.20.6	Cumulative Impacts	8-360
8.20.6.1	Transboundary Cumulative Impacts	8-360
8.21	Summary of Ecosystem Services Impacts.....	8-360

8.21.1	Ecosystem Service Impacts.....	8-360
8.21.2	Ecosystem Service Dependencies	8-361
8.22	Climate	8-363
8.22.1	Key Sensitivities and Considerations	8-363
8.22.2	Project Greenhouse Gas Emissions.....	8-364
8.22.2.1	Greenhouse Gases and Global Warming Potentials.....	8-364
8.22.2.2	Carbon Intensity.....	8-364
8.22.2.3	Direct Emissions – Construction and Commissioning Phases	8-366
8.22.2.4	Indirect Emissions – Construction and Commissioning Phases.....	8-366
8.22.2.5	Direct Emissions – Operation Phase	8-366
8.22.2.6	Indirect Emissions – Operation Phase.....	8-368
8.22.3	Effect of Climate Change	8-368
8.22.4	Mitigation Measures.....	8-369
8.22.4.1	GHG Emissions	8-369
8.22.5	Cumulative Impacts	8-369
8.22.6	Conclusions	8-369
8.23	Pipeline and AGI Decommissioning.....	8-370
8.24	Associated Facilities.....	8-370
8.24.1	Tilenga Project.....	8-371
8.24.2	Kingfisher Oil Project	8-377

9	POTENTIAL IMPACT IDENTIFICATION AND EVALUATION – UNPLANNED EVENTS ..	9-1
9.1	Introduction	9-1
9.2	Risk Management Approach.....	9-2
9.2.1	Preliminary Risk Rating	9-3
9.3	Risk Reduction	9-3
9.3.1	Design and Construction Mitigation	9-3
9.3.1.1	Construction	9-3
9.3.1.2	Operations	9-4
9.3.2	Health, Safety, Security, Society and Environment Systems and Procedures	9-5
9.3.3	Emergency Response Planning	9-6
9.4	Construction Risks	9-7
9.4.1	Traffic Accidents	9-7
9.4.1.1	Preventive and Mitigation Measures for Traffic Accident	9-8
9.4.2	Fires	9-10
9.4.3	Damage to Third-Party Assets.....	9-10
9.4.4	Fuel Storage Tank Release – Main Camp Pipe Yards and Construction Sites ..	9-11
9.4.5	Hydrotest Water Release.....	9-12
9.5	Operation Risk	9-13
9.5.1	Potential Causes of a Pipeline Breach	9-13
9.5.1.1	Geophysical Hazards (e.g., Earthquakes, Landslides)	9-13
9.5.1.2	Sabotage.....	9-14
9.5.2	Oil Spill Modelling	9-14
9.5.2.1	Oil Spill Modelling Process Overview	9-15
9.5.2.2	Data Sources	9-15
9.5.2.3	Initial Sensitivity Analysis	9-15
9.5.2.4	Oil Spill Valued Environmental Component Sensitivity Maps	9-15

9.5.2.5	Environmental and Social Sensitivity	9-16
9.5.2.6	Preliminary Quantitative Risk Assessment	9-16
9.5.2.7	Guidance Values.....	9-17
9.5.2.8	Spill Scenario	9-18
9.5.2.9	Surface Water Impacts from Groundwater Migration of Dissolved Oil Spill Components.....	9-18
9.5.2.10	Groundwater Impacts from Migration of Dissolved Oil Spill Components	9-19
9.5.2.11	Unsaturated Zone Impacts from Oil Spills	9-19
9.5.2.12	Surface Water Crossings Impacts from Oil Spills	9-20
9.5.3	Preventive and Mitigation Measures Reducing Impact of Oil Spills	9-21
9.6	Decommissioning.....	9-21
9.7	Summary of Unplanned Events	9-21
10	ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLANS	10-1
10.1	Introduction	10-1
10.2	Health, Safety, Security, Society and Environment Charter	10-2
10.3	Objectives and Targets	10-3
10.4	Reporting System.....	10-3
10.5	Environmental and Social Management and Monitoring Plan Matrix	10-4
10.6	Roles and Responsibilities.....	10-4
10.7	Management Plans	10-7
10.7.1	MP01: Biodiversity Management Plan.....	10-8
10.7.2	MP02: Pollution Prevention Plan	10-8
10.7.3	MP03: Waste Management Plan	10-8
10.7.4	MP04: Natural Resource Management Plan	10-9
10.7.5	MP05: Soil Management Plan	10-9
10.7.6	MP06: Cultural Heritage Management Plan	10-9
10.7.7	MP07: Reinstatement Plan	10-9
10.7.8	MP08: Stakeholder Engagement Plan	10-10
10.7.9	MP09: Resettlement Action Plan	10-10
10.7.10	MP10: Labour Management Plan	10-10
10.7.11	MP11: Project Induced In-Migration Management Plan	10-11
10.7.12	MP12: Procurement and Supply Chain Management Plan	10-11
10.7.13	MP13: Infrastructure and Utilities Management Plan	10-11
10.7.14	MP14: Community Health, Safety and Security Plan	10-12
10.7.15	MP15: Occupational Health, Safety and Security Plan	10-12
10.7.16	MP16: Transport and Road Safety Management Plan.....	10-12
10.7.17	MP18: Emergency Preparedness and Response Plan	10-12
10.7.18	MP19: Monitoring and Reporting Plan.....	10-13
10.7.19	MP20: Decommissioning Plan.....	10-13
10.8	Supporting Subplans.....	10-14
10.9	Training Needs and Capacity Building	10-14
10.9.1	Training Needs.....	10-14
10.9.2	Capacity Building	10-15
10.10	Management of Change.....	10-15
10.11	Estimated Costs	10-15

11	SUMMARY AND RECOMMENDATIONS.....	11-1
11.1	Introduction	11-1
11.2	Stakeholder Engagement	11-1
11.2.1	Stakeholder Concerns	11-2
11.2.1.1	Socio-economic and Health	11-2
11.2.1.2	Physical Environment	11-3
11.2.1.3	Biodiversity.....	11-3
11.2.1.4	Project and ESIA-Related Matters (Including Stakeholder Engagement)	11-3
11.2.2	Grievance Procedure.....	11-3
11.2.3	Ongoing Stakeholder Engagement	11-4
11.3	Impacts – Normal Operations	11-4
11.3.1	Beneficial Impacts.....	11-7
11.3.2	Significant Residual Project Impacts	11-7
11.3.3	Transboundary Impacts	11-7
11.3.4	Cumulative Impacts	11-8
11.3.5	Associated Facilities	11-8
11.4	Impacts – Abnormal Operations and Unplanned Events.....	11-9
11.5	Decommissioning.....	11-10
11.6	Environmental and Social Management Plans	11-10
11.7	Recommendations	11-11
12	REFERENCES.....	12-1

TABLES

Table 1.3-1	Contact Information	1-5
Table 1.4-1	Registered and Key Contributing Members of the Environmental and Social Impact Assessment Team	1-7
Table 1.5-1	Environmental Impact Statement Structure.....	1-10
Table 2.2.1	Project Design Basis.....	2-2
Table 2.3.1	Components of the EACOP System in Uganda	2-8
Table 2.3.2	Main Camp and Pipe Yard Locations	2-17
Table 2.3.3	Access Roads and Approximate Lengths.....	2-19
Table 2.3.4	Land Requirements.....	2-20
Table 2.4.1	Potential Construction Facilities Water Sources.....	2-23
Table 2.4-2	Road Upgrades.....	2-27
Table 2.4.3	Population Centres Near Project Facilities	2-31
Table 2.4.4	Crossings	2-44
Table 2.4.5	Pumping Station Function Checks.....	2-63
Table 2.6.1	Project Schedule	2-73
Table 3.5.1	Route Refinement Criteria	3-9
Table 3.6.1	Pipeline Design Cases During Pre-Front-End Engineering and Design	3-16
Table 3.6.2	Preliminary and Final Pump Station Locations for EACOP Uganda	3-17
Table 3.6.3	Electric Substation Siting – Combined and Standalone	3-17
Table 3.6.4	Construction Facility Location Selection Criteria	3-19

Table 3.7.1	Insulation Alternatives	3-37
Table 3.7.2	Electrical Heat Tracing Alternatives	3-40
Table 3.7.3	Bulk Heater Alternatives	3-41
Table 3.8.1	Line Pipe Transportation Options	3-43
Table 3.8.2	Crossing Alternatives	3-45
Table 4.2-1	Ugandan Legislation	4-2
Table 4.2-2	Policies and Plans	4-21
Table 4.2-3	Regulations and Guidelines.....	4-41
Table 4.2-4	Administrative Institutions.....	4-54
Table 4.3-1	Permits, Licences and Authorisations	4-65
Table 4.4-1	International Conventions and Agreements	4-71
Table 4.4-2	International Finance Corporation Performance Standards 2012	4-79
Table 4.4-3	International Finance Corporation Guidelines	4-81
Table 4.4-4	Equator Principles.....	4-82
Table 5.6-1	Impact Duration Grading.....	5-15
Table 5.6-2	Impact Extent Grading	5-15
Table 6.4-1	Protected Area Sensitivity Ranking	6-17
Table 6.4-2	Physiognomic Habitat Classes in the Area of Influence.....	6-19
Table 6.4-3	Habitat and Flora Sensitivity Ranking.....	6-28
Table 6.4-4	Key Flora Considerations	6-30
Table 6.4-5	Site-Specific Trends in Condition and Sensitivity to Change	6-37
Table 6.4-6	Aquatic Biodiversity VECs and Sensitivity Ranking.....	6-38
Table 6.4-7	Avifauna of Conservation Importance	6-42
Table 6.4-8	Avifauna Valued Environmental Components and Sensitivity Ranking	6-44
Table 6.4-9	Avifauna Key Considerations.....	6-46
Table 6.4-10	Fauna Sensitivity Ranking	6-53
Table 6.4-11	Key Fauna Considerations	6-55
Table 6.4-12	Soil Fertility Sensitivity Ranking.....	6-61
Table 6.4-13	Soil Compaction Sensitivity Ranking	6-61
Table 6.4-14	Soil Erosion Sensitivity Ranking	6-62
Table 6.4-15	Road Crossings - Stability of Road Drainage Valued Environmental Components ..	6-66
Table 6.4-16	Project Facilities – Stability of Watercourses Nearby Installations.....	6-67
Table 6.4-17	Estimated Median Monthly Flows at Main Watercourse Crossings, m ³ /s	6-68
Table 6.4-18	Main Pipeline Crossings - River Channel Morphology and Stability	6-71
Table 6.4-19	Surface Water Flow Sensitivity Rankings – Pipeline Crossings.....	6-77
Table 6.4-20	Surface Water Flow Sensitivity Rankings – Road Crossings	6-78
Table 6.4-21	Surface Water Flow Sensitivity Rankings – Project Facilities	6-78
Table 6.4-22	River Channel Morphology and Stability Sensitivity Rankings – Pipeline Crossings	6-79
Table 6.4-23	River Channel Morphology and Stability Sensitivity Rankings – Road Crossings	6-80
Table 6.4-24	River Channel Morphology and Stability Sensitivity Rankings – Project Facilities....	6-80
Table 6.4-25	Water and Sediment Quality and Sensitivity to Contamination Sensitivity Rankings – Pipeline Crossings	6-81
Table 6.4-26	Sensitivity to Contamination Sensitivity Rankings – Road Crossings	6-82
Table 6.4-27	Sensitivity to Contamination Sensitivity Rankings – Project Facilities.....	6-83

Table 6.4-28	Summary of Aquifer Geology and Characteristics.....	6-86
Table 6.4-29	Groundwater VEC Sensitivity Ranking	6-89
Table 6.4-30	Pumping Station 1: Landscape Receptor Sensitivity Ranking	6-96
Table 6.4-31	Pumping Station 2: Landscape Receptor Sensitivity Ranking	6-97
Table 6.4-32	Summary of Average Measured Baseline Substance Concentrations.....	6-98
Table 6.4-33	Air Quality VEC Sensitivity Ranking	6-100
Table 6.4-34	Acoustic Receptor Sensitivity Ranking – Presence in Area of Influence	6-105
Table 6.4-35	Demographic Data, 2014.....	6-118
Table 6.4-36	Education Valued Environmental Components and Sensitivity Ranking	6-123
Table 6.4-37	Local Economy (Nonland-Based Livelihoods) Valued Environmental Components and Sensitivity Ranking.....	6-130
Table 6.4-38	Crop Farming VECs and Sensitivity Ranking	6-135
Table 6.4-39	Livestock Rearing Valued Environmental Components and Sensitivity Ranking....	6-142
Table 6.4-40	Mining Valued Environmental Components and Sensitivity Ranking.....	6-147
Table 6.4-41	Natural Resources Use and Sensitivity Ranking	6-152
Table 6.4-42	River- and Lake-Based Livelihoods Valued Environmental Components and Sensitivity Ranking.....	6-156
Table 6.4-43	Land Management Challenges.....	6-159
Table 6.4-44	Land and Property Valued Environmental Components and Sensitivity Ranking... 6-161	
Table 6.4-45	Workers' Health, Safety and Welfare Valued Environmental Components and Sensitivity Ranking.....	6-164
Table 6.4-46	Social Infrastructure and Social Services Valued Environmental Components and Sensitivity Ranking.....	6-168
Table 6.4-47	Health System Delivery Structure.....	6-169
Table 6.4-48	Community Health Valued Environmental Component and Sensitivity Ranking 6-173	
Table 6.4-49	Communicable Disease Valued Environmental Components and Sensitivity Ranking.....	6-175
Table 6.4-50	Vector-Related Diseases and Sensitivity Ranking	6-177
Table 6.4-51	Soil-, Water- and Waste-Related Disease Valued Environmental Components and Sensitivity Ranking.....	6-179
Table 6.4-52	Sexually Transmitted Disease Valued Environmental Components and Sensitivity Ranking	6-182
Table 6.4-53	Food and Nutrition Related Valued Environmental Components and Sensitivity Ranking	6-183
Table 6.4-54	Socially Determined Diseases Related Valued Environmental Components and Sensitivity Ranking.....	6-187
Table 6.4-55	Social Cultural Health Practice Related Valued Environmental Components and Sensitivity Ranking.....	6-188
Table 6.4-56	Community Safety, Security and Welfare Valued Environmental Components and Sensitivity Ranking.....	6-193
Table 6.4-57	Traffic-Related Valued Environmental Components Sensitivity Ranking.....	6-199
Table 6.5-1	Ecosystem Service References.....	6-209
Table 7.5-1	Stakeholder Categories and Subcategories	7-5
Table 8.2-1	Permanent Habitat Loss (Aboveground Installations and Operational Right-of-Way) (ha)	8-8
Table 8.2-2	Temporary Habitat Loss (Right-of-Way and Construction Facilities) (ha)	8-9
Table 8.2-3	Permanent Wetland Forest Loss	8-12

Table 8.2-4 Permanent Habitat Loss in Taala Forest	8-13
Table 8.2-5 Temporary Habitat Loss in Taala FR	8-14
Table 8.2-6 Habitats of Conservation Importance – Generic Impacts	8-23
Table 8.2-7 Habitats of Conservation Importance – Location-Specific Impacts	8-25
Table 8.3-1 Flora and Fauna Species of Conservation Importance (Terrestrial and Aquatic) – Generic Impacts	8-57
Table 8.3-2 Flora and Fauna Species of Conservation Importance (Terrestrial and Aquatic) – Location-Specific Impacts	8-61
Table 8.4-1 Legally Protected, Internationally or Nationally Recognised Onshore Areas – Location-Specific Impacts	8-73
Table 8.5-1 Soil – Generic Impacts	8-87
Table 8.5-2 Soil – Location-Specific Impacts	8-89
Table 8.6-1 Surface Water – Generic Impacts	8-103
Table 8.6-2 Surface Water – Location-Specific Impacts	8-104
Table 8.7-1 Groundwater – Generic Impacts	8-112
Table 8.7-2 Groundwater – Location-Specific Impacts	8-113
Table 8.8-1 Landscape – Generic Impacts	8-124
Table 8.8-2 Landscape – Location-Specific Impacts	8-125
Table 8.9-1 Air Quality – Generic Impacts	8-136
Table 8.9-2 Air Quality – Location-Specific Impacts	8-137
Table 8.9-3 Air Quality – Third-Party Developments	8-140
Table 8.10-1 Acoustic Environment – Generic Impacts	8-154
Table 8.10-2 Acoustic Environment – Location-Specific Impacts	8-155
Table 8.10-3 Acoustic Environment – Third-Party Developments	8-158
Table 8.11-1 Project Annual Economic Benefits	8-165
Table 8.11-2 Economy – Generic Enhancements	8-167
Table 8.12-1 Local Economy (Nonland-Based Livelihoods) – Generic Impacts	8-185
Table 8.12-2 Local Economy (Nonland-Based Livelihoods) – Location-Specific Impacts	8-187
Table 8.12-3 Cumulative Impacts: Local Economy (Non Land-based Livelihoods)	8-195
Table 8.13-1 Land-Based Livelihoods – Generic Impacts	8-219
Table 8.13-2 Land-Based Livelihoods – Location-Specific Impacts	8-221
Table 8.13-3 Cumulative Impacts: Land-Based Livelihoods	8-225
Table 8.14-1 River and Lake-Based Livelihoods – Generic Impacts	8-236
Table 8.14-2 River and Lake-Based Livelihoods – Location-Specific Impacts	8-236
Table 8.15-1 Summary of Project Land Requirements	8-239
Table 8.15-2 Land and Property – Generic Impacts	8-252
Table 8.15-3 Land and Property – Location-Specific Impacts	8-254
Table 8.15-4 Cumulative Impacts: Land and Property	8-260
Table 8.16-1 Workers' Health, Safety and Welfare – Generic Impacts	8-273
Table 8.16-2 Workers' Health, Safety and Welfare – Location-Specific Impacts	8-273
Table 8.17-1 Heavy Goods Vehicle Movements Required to Transport Construction Materials to Each Location	8-277
Table 8.17-2 Traffic Movements for Pumping Station Construction from Moving People, Material and Equipment	8-278
Table 8.17-3 Traffic Movements for Pipeline Construction from Moving People, Material and Equipment	8-278
Table 8.17-4 Location-Specific Traffic Increases Associated with the Movement of Construction Materials for Construction Facilities	8-281

Table 8.17-5 Location-Specific Traffic Increases for Pipeline Construction from Moving People, Material and Equipment.....	8-281
Table 8.17-6 Social Infrastructure and Services – Generic Impacts	8-288
Table 8.17-7 Social Infrastructure and Services – Location-Specific Impacts.....	8-289
Table 8.17-8 Location-Specific Traffic Increases for EACOP, Tilenga and Kingfisher Projects from Moving People, Material and Equipment.....	8-291
Table 8.17-9 Cumulative Impacts: Roads.....	8-292
Table 8.18-1 Community Health – Generic Impacts	8-315
Table 8.18-2 Community Health – Location-Specific Impacts	8-316
Table 8.18-3 Cumulative Impacts: Community Health	8-324
Table 8.19-1 Community Safety, Security and Welfare – Generic Impacts	8-338
Table 8.19-2 Community Safety, Security and Welfare – Location-Specific Impacts.....	8-339
Table 8.19-3 Cumulative Impacts: Community Safety, Security and Welfare	8-343
Table 8.20-1 Tangible and Intangible Cultural Heritage – Generic Impacts.....	8-356
Table 8.20-2 Tangible and Intangible Cultural Heritage – Location-Specific Impacts	8-358
Table 8.21-1 Ecosystem Service References.....	8-360
Table 8.21-2 Ecosystem Service Dependencies	8-362
Table 8.22-1 GHG Emission Factors for Crude Oil Combustion	8-364
Table 8.22-2 Operational Direct Greenhouse Gas Emissions Inventory.....	8-367
Table 8.24-1 Beneficial Impacts of the Tilenga Project	8-372
Table 8.24-2 Significant Residual Impacts of the Tilenga Project	8-374
Table 8.24-3 Beneficial Impacts of the Kingfisher Oil Project.....	8-377
Table 8.24-4 Significant Residual Impacts of the Kingfisher Oil Project.....	8-378
Table 9.4-1 VECs Affected by Potential Road Traffic Accidents	9-8
Table 9.5-1 Block Valves Near Sensitive Locations	9-21
Table 9.7-1 Summary of Unplanned Events	9-22
Table 10.6-1 Roles and Responsibilities.....	10-5
Table 11.3-1 Impacts Assessed and Mitigation Measures	11-7

FIGURES

Figure 1.3-1 Lake Albert Development Area.....	1-3
Figure 1.3-2 EACOP System	1-4
Figure 2.1-1 EACOP System Components.....	2-2
Figure 2.2-1 Design Principle Overview.....	2-3
Figure 2.3-1 EACOP Corridor and Aboveground Installations	2-6
Figure 2.3-2 Typical EACOP Pipeline Cross-Section	2-8
Figure 2.3-3 Typical Pumping Station.....	2-9
Figure 2.3-4 Power Generation Architecture	2-11
Figure 2.3-5 Electrical Distribution System	2-12
Figure 2.3-6 Typical Electric Substation with Main Line Block Valve	2-12
Figure 2.3-7 Typical Main Line Block Valve.....	2-14
Figure 2.3-8 Typical Solar Panel Array at Main Line Block Valve Stations	2-15

Figure 2.3-9 Construction Facility Locations.....	2-16
Figure 2.3-10 Typical Main Camp and Pipe Yard.....	2-18
Figure 2.4-1 Construction Spreads	2-24
Figure 2.4-2 Road Upgrades	2-28
Figure 2.4-3 Typical Topsoil Removal	2-33
Figure 2.4-4 Typical Stringing.....	2-34
Figure 2.4-5 Typical Cold Bending Machine.....	2-35
Figure 2.4-6 Typical Pipeline Welding	2-36
Figure 2.4-7 Automatic Ultrasonic Testing.....	2-37
Figure 2.4-8 Anti-Corrosion Field Joint Coating.....	2-38
Figure 2.4-9 Typical Trenching Machine.....	2-39
Figure 2.4-10 Lower and Lay	2-41
Figure 2.4-11 High-Voltage Power Cable Installation.....	2-42
Figure 2.4-12 Open Cut Crossing	2-46
Figure 2.4-13 Crossing of Annual Wetlands	2-47
Figure 2.4-14 Crossing of Seasonal Wetland	2-48
Figure 2.4-15 Auger Bore.....	2-49
Figure 2.4-16 Typical Fault Crossing Plan.....	2-50
Figure 2.4-17 Typical French Drain	2-56
Figure 2.4-18 Straw Bale Filter	2-57
Figure 2.4-19 Typical Silt Fence	2-57
Figure 2.4-20 Typical Sediment Trap.....	2-58
Figure 2.4-21 Sediment Basin	2-59
 Figure 3.3-1 Alternatives Assessment Process	3-2
Figure 3.5-1 Routing Area of Interest (left) and Excluded Areas (right)	3-5
Figure 3.5-2 Pipeline Corridors	3-6
Figure 3.5-3 Route Refinement Process.....	3-8
Figure 3.5-4 Pre-Front-End Engineering and Design Corridor EACOP Uganda Corridor Summary Constraint Zones.....	3-11
Figure 3.5-5 EACOP Uganda Route Refinements V4 to V5.....	3-13
Figure 3.5-6 Alternative Routes around Wambabya and Bugoma Forest Reserves.....	3-14
Figure 3.6-1 Pressure Profile and Pumping Station Locations	3-16
Figure 3.6-2 Main Camp and Pipe Yard 1 Alternative Locations.....	3-21
Figure 3.6-3 Main Camp and Pipe Yard 1 Alternative 1.....	3-22
Figure 3.6-4 Main Camp and Pipe Yard 1 Alternative 2.....	3-22
Figure 3.6-5 Main Camp and Pipe Yard 1 Alternative 3 – Selected Location.....	3-23
Figure 3.6-6 Main Camp and Pipe Yard 2 Alternative Locations.....	3-24
Figure 3.6-7 Main Camp and Pipe Yard 2 Alternative 1 and 3 - Selected Location	3-25
Figure 3.6-8 Main Camp and Pipe Yard 2 Alternative 2.....	3-25
Figure 3.6-9 Main Camp and Pipe Yard 2 Alternative 2 – Graveyard	3-26
Figure 3.6-10 Main Camp and Pipe Yard 3 Alternative Locations.....	3-27
Figure 3.6-11 Main Camp and Pipe Yard 3 Alternative 1.....	3-28
Figure 3.6-12 Main Camp and Pipe Yard 3 Alternative 2.....	3-28
Figure 3.6-13 Main Camp and Pipe Yard 3 Alternative 3 – Selected Location.....	3-29
Figure 3.6-14 Phase 1 Location Selected for Main Camp and Pipe Yard 4 at KP259.5	3-30
Figure 3.6-15 Phase 2 Alternate 1 for Main Camp and Pipe Yard 4 at KP258	3-31

Figure 3.6-16 Phase 2 Alternate 2 for Main Camp and Pipe Yard 4 at KP262.5	3-31
Figure 3.6-17 Phase 3 Main Camp and Pipe Yard 4 Location at KP288	3-32
Figure 3.6-18 Phase 4 Alternative 1 for Main Camp and Pipe Yard 4 at KP283 – Selected Location...	3-33
Figure 3.6-19 Phase 4 Alternative 2 for Main Camp and Pipe Yard 4 at KP282	3-34
Figure 3.7-1 Bulk Heating vs Electric Heat Trace Heat Loss.....	3-39
Figure 4.3-1 Environmental Impact Assessment Process	4-63
Figure 4.4-1 Plan–Do–Check–Act Continuous Improvement Cycle	4-85
Figure 5.2-1 Key Steps in the EACOP Environmental and Social Impact Assessment Process	5-2
Figure 5.6-1 Cumulative Impact Assessment Process	5-7
Figure 5.6-2 Schematic of the Shared Areas of Interest.....	5-10
Figure 6.4-1 Protected Areas in the Area of Influence.....	6-8
Figure 6.4-2 Wambabya Forest Reserve Land Cover, Habitat and Imagery	6-10
Figure 6.4-3 Taala Forest Reserve Land Cover, Habitat and Imagery	6-12
Figure 6.4-4 Kasana–Kasambya Forest Reserve Land Cover, Habitat and Imagery	6-14
Figure 6.4-5 Estimated Extent of Guineo–Congolian Semi-Evergreen Forest in the Area of Influence and the Broader Region.....	6-23
Figure 6.4-6 Estimated Extent of Riverine and Swamp Forest.....	6-24
Figure 6.4-7 Main Watercourse Crossings and Catchments	6-64
Figure 6.4-8 Streamflow Regime at Watercourse Crossings.....	6-69
Figure 6.4-9 Water Accessibility and Scarcity Along the Pipeline	6-75
Figure 6.4-10 Area of Influence, and Pumping Station 1 Viewpoint Photograph Locations	6-93
Figure 6.4-11 Area of Influence, and Pumping Station 2 Viewpoint Photograph Locations	6-95
Figure 6.4-12 Sample Sites and Potentially Affected Communities – North	6-109
Figure 6.4-13 Sample Sites and Potentially Affected Communities – South.....	6-110
Figure 6.4-14 Focus Group Discussion and Participatory Mapping with Women in Miti, Sembabule District (KP194).....	6-113
Figure 6.4-15 Data Collection at District and Potentially Affected Community Level	6-114
Figure 6.4-16 Government Structure of Uganda	6-115
Figure 6.4-17 Age Profile	6-117
Figure 6.4-18 Literacy Rates for Persons Aged 10 Years and Above, 2002–2014.....	6-121
Figure 6.4-19 Local Market in Katikara Trading Centre, Kakumiro District (KP41)	6-132
Figure 6.4-20 Localised Nomadic Movements.....	6-139
Figure 6.4-21 Milk being Transported to the Dairy by Motorcycle in Hoima, Hoima District (KP74.5)	6-140
Figure 6.4-22 Artisanal Mining in the Sample Potentially Affected Communities.....	6-145
Figure 6.4-23 Natural Resources Harvested in the Sample Potentially Affected Communities ...	6-149
Figure 6.4-24 Wood Cut for Firing a Brick Kiln in Katikara Trading Centre, Kakumiro District (KP41)	6-150
Figure 6.4-25 Fishermen Using Nets to Catch Fish in Bethlehem, Kyotera District (KP247.5)....	6-154
Figure 6.4-26 Health Facilities by District	6-172
Figure 7.5-1 Districts, Subcounties and Villages Consulted During the Scoping Phase	7-7
Figure 7.5-2 Stakeholder Meeting at Kamuli Village.....	7-9
Figure 7.5-3 Stakeholder Meeting with Rakai District Local Government	7-10

Figure 7.5-4 Districts, Subcounties and Villages Consulted During the Baseline and Impact Assessment Phase	7-13
Figure 7.5-5 Stakeholder Meeting at Katikara Village, Kakumiro District	7-15
Figure 7.5-6 Stakeholder Meeting at Kabonera Village, Kyotera District	7-15
Figure 7.5-7 Districts, Subcounties and Villages Consulted in the Pre-Submission Meetings	7-18
Figure 7.5-8 District Meeting with Hoima District Technical Planning Committee and Political Leaders	7-19
Figure 7.5-9 Community Meeting in Kijaguzo Village, Mubende District	7-20
Figure 7.6-1 Grouping of Concerns and Comments by Environmental and Social Impact Assessment Phase	7-22
Figure 7.6-2 Grouping of Concerns and Aspirations from Focus Group Discussions during the Baseline and Impact Assessment Phase	7-23
Figure 7.7-1 Project Grievance Procedure	7-35
Figure 8.3-1 Wambabya Forest Reserve and the Corridors of Remnant Riparian Forest Linking it to Bugoma Central Forest Reserve	8-66
Figure 8.3-2 Cumulative Impacts: Wambabya - Bugoma Corridor	8-68
Figure 8.8-1 PS1 Viewpoint PS1-A Photograph	8-118
Figure 8.8-2 PS1 Viewpoint PS1-B Photograph	8-118
Figure 8.8-3 PS2 Viewpoint PS2-A Photograph	8-119
Figure 8.8-4 PS2 Viewpoint PS2-B Photograph	8-119
Figure 8.12-1 Cumulative Impacts: Hoima District	8-193
Figure 8.17-1 Baseline Traffic Flows (Blue) and Predicted Traffic Movements at Project Locations (Green) (Per Day)	8-282
Figure 8.17-2 Cumulative Impacts: Road Improvements	8-294
Figure 8.22-1 Progressive Total Carbon Intensity During Project Life	8-365
Figure 9.5-1 Oil Spill VEC Sensitivity	9-17

APPENDIX A: BASELINE REPORTS

- Appendix A1 Botany Biodiversity Baseline Report
- Appendix A2 Aquatic Biodiversity Baseline Report
- Appendix A3 Avifauna Biodiversity Baseline Report
- Appendix A4 Fauna Biodiversity Baseline Report
- Appendix A5 Geology and Soil Baseline Report
- Appendix A6: Surface Water Baseline Report
- Appendix A7: Groundwater Baseline Report
- Appendix A8 Landscape Baseline Report
- Appendix A9 Air Quality Baseline Report
- Appendix A10: Acoustics Baseline Report
- Appendix A11: Socio-economic and Health Baseline Report
- Appendix A12 Traffic Baseline Report
- Appendix A13: Tangible and Intangible Cultural Heritage Baseline Report
- Appendix A14: Climate Baseline Report

APPENDIX B: COMPANY CERTIFICATE OF REGISTRATION

APPENDIX C: STAKEHOLDER ENGAGEMENT

- Appendix C1: Lists of Stakeholders
- Appendix C2: Stakeholder Materials
- Appendix C3: Stakeholder Concerns
- Appendix C4: Records of Stakeholder Engagement

APPENDIX D: MAGNITUDE AND SENSITIVITY TABLES**APPENDIX E: IMPACT ASSESSMENT TABLES**

- Appendix E1: Project Aspects
- Appendix E2: Generic Impacts Register
- Appendix E3: Location-Specific Impacts Register
- Appendix E4: Environmental and Social Management Plans
- Appendix E5: Content Tables of Management Plans

APPENDIX F: PROJECT ENVIRONMENTAL STANDARDS**APPENDIX G: IMPACTS ASSESSMENTS**

- Appendix G1: Erosion Risk Assessment
- Appendix G2: Acoustic Impact Assessment
- Appendix G3: Greenhouse Gas Emissions Calculations

APPENDIX H: CUMULATIVE IMPACT ASSESSMENT

- Appendix H1: Sources of Cumulative Impact
- Appendix H2: Location of Screened-In Third-Party Developments
- Appendix H3: Cumulative Impacts Assessment Screening Matrix
- Appendix H4: Screened-Out Sources of Cumulative Impact

APPENDIX I: OIL SPILL MODELLING**APPENDIX J: ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN AND MONITORING PARAMETERS****APPENDIX K: RESETTLEMENT POLICY STRATEGY****APPENDIX L: CONCORDANCE TABLE****APPENDIX M: ACKNOWLEDGEMENTS****APPENDIX N: PROJECT CHEMICALS**